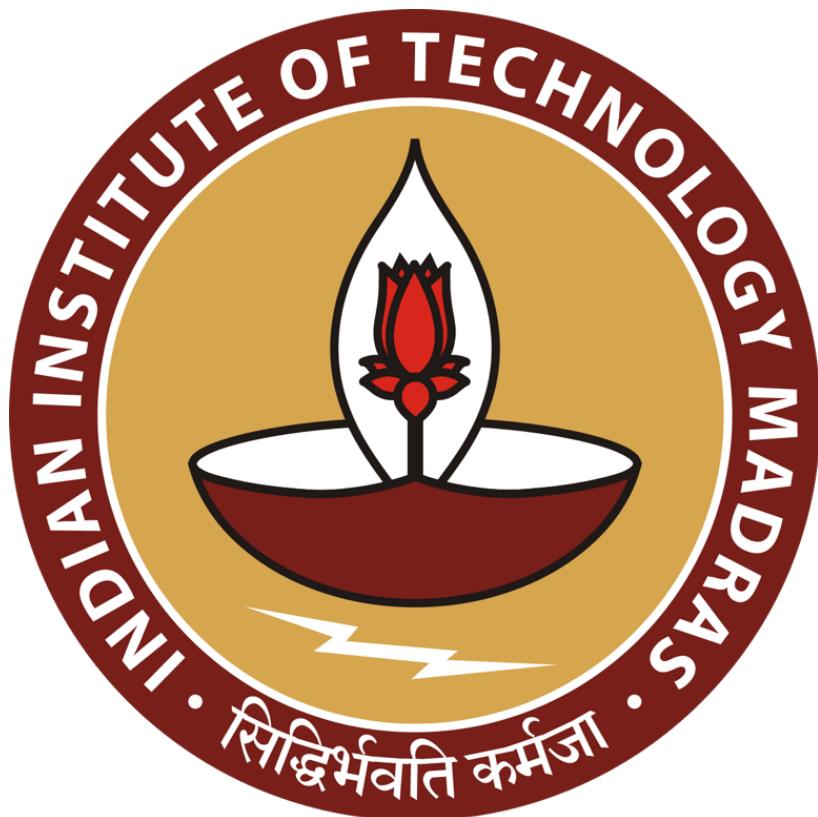


# **INDIAN INSTITUTE OF TECHNOLOGY**

## **MADRAS**

### **Final Submission**



## **Growing the Trust: Analysing Membership Trends and Identifying Opportunities for Growth at a Social Charitable Trust**

**Submitted By :**

**Name: G Vagadeeshwar**

**Roll No: 21f1005494**

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## **Executive Summary :**

Trust is a non-profit organisation serving the community through various programs and initiatives. The organisation has operated for over two years, primarily focusing on providing aid to underprivileged sections of society. It aims to achieve its long-term goals with the help of a corpus fund ready to receive one-time donations and expects to carry out its short-term aims with the help of monthly and one-time contributions. According to the managing trustee, the Trust wants to expand its member base and outreach.

Data about its members, month-wise/one-time contributions, and expenditures were requested to address this challenge. Analysing its operations would help identify areas where improvements could be made. The project's key objectives are to analyse the Trust's balance sheet better to understand its financial position and the trust's member profiles and their contributions to understand the member demographics.

Additionally, the project aims to identify other potential areas for improvement, such as evaluating the effectiveness of current initiatives, identifying investment opportunities, and ensuring the organisation's long-term financial sustainability.

The project results will be presented in a final report, including recommendations for action based on the findings. Overall, the project intends to help the Social Charitable Trust overcome its challenges and achieve its mission of serving the community more effectively and sustainably.

## **Analysis Process :**

The following provides links to the excel files used for the analysis process:

[Aid21-22.xlsx](#) [Donation\\_Reg.xlsx](#) (Links Revoked for the sake of privacy)

The analysis for this project relied primarily on the functionality of Excel, with Tableau supplementing demographic exploration. The initial stage of the analysis was to generate basic descriptive statistics. This entailed calculating measures of central tendency, like mean and median, to provide a snapshot of typical donations and aid data values. Additionally, measures of dispersion and skewness were used to understand the spread and asymmetry in the data distribution.

A range of visualization methods were utilized, including pie charts for understanding categorical distribution, bar graphs for comparative analysis, line graphs for tracking temporal trends, and box plots to reveal the data's distribution and variability. Notably, a strong correlation between data trends and fitted trendlines was seen in vital metrics, such as donations and member growth over time, prompting further exploration into the factors driving these trends. Interesting patterns in aid amounts were also observed when analysing the aid data.

Lastly, the financial stability and performance of the trust were evaluated by analyzing the balance sheet and calculating important financial ratios. This step was crucial in understanding the trust's financial health and ensuring sustainable operation in the long term.

## **Results & Findings :**

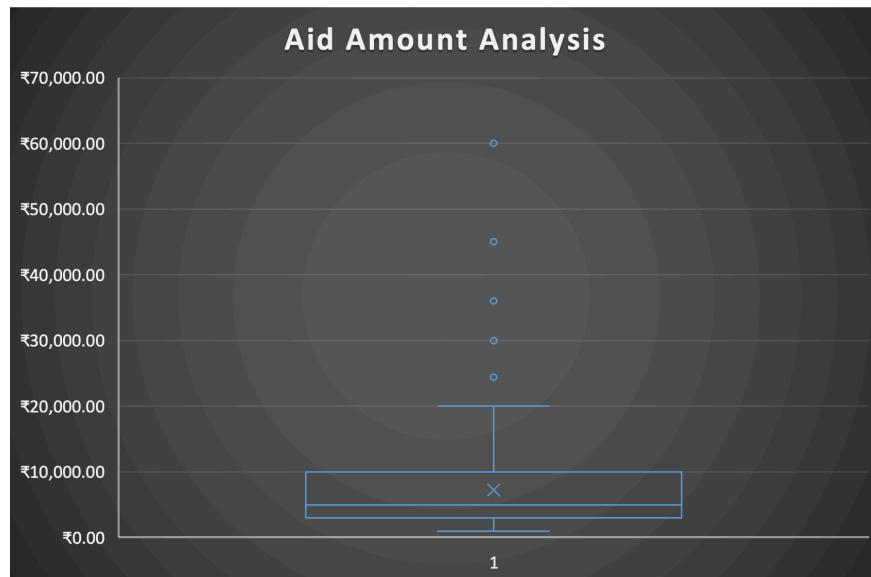
### **Descriptive Analysis**

During the descriptive statistics phase, an extensive statistical analysis was conducted on both the donations and aid data. Fundamental quantitative measures such as mean, median, and mode were computed to evaluate the central tendency of donation amounts and frequencies. Dispersion of donation amounts was measured using the range, variance, and standard deviation.

Distribution characteristics, including skewness and kurtosis, were examined to gain insights into the shape of the distribution and detect potential outliers. A notable skewness of 5 and kurtosis of 35 were identified in the dataset, indicating a heavy right-skewness and a large number of outliers. This could potentially be due to significant one-time donations, while the monthly donations predominantly clustered around the ₹1000 mark, as indicated by the mean, median, and mode.

In addition, counts and proportions were calculated to provide insights about the total number of members, the proportion of active members, and the distribution of members by geographical location.

The same descriptive statistical approach was applied to the aid data. This examination allowed for identification of the average, dispersion, and distribution characteristics of aid amounts for each type of aid on a month-by-month basis. A box plot was generated to visualize and identify outliers in the aid amounts, providing a comprehensive overview of the Trust's donation and aid distribution.



**Figure 1: Outlier and Distribution Analysis of Aid data**

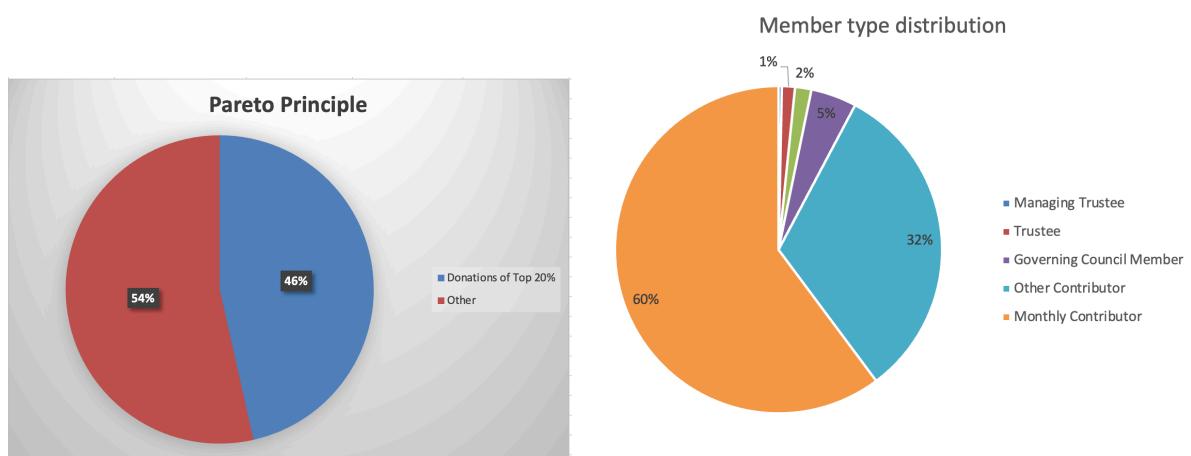
The boxplot reveals five outliers, all corresponding to high one-time donation amounts. The central tendency of the donation data was represented by a mean donation amount of approximately ₹7000 and a median of ₹5000.

Furthermore, the analysis revealed interesting patterns in the distribution of aid types. The last rites aid, although high in frequency, presented a comparatively lower average amount of around ₹5,600. Conversely, the medical aid, despite its low frequency, recorded the highest average aid amount of approximately ₹12000. These findings offer valuable insights into the allocation of resources across various aid categories within the Trust's operations.

## Member Base Analysis

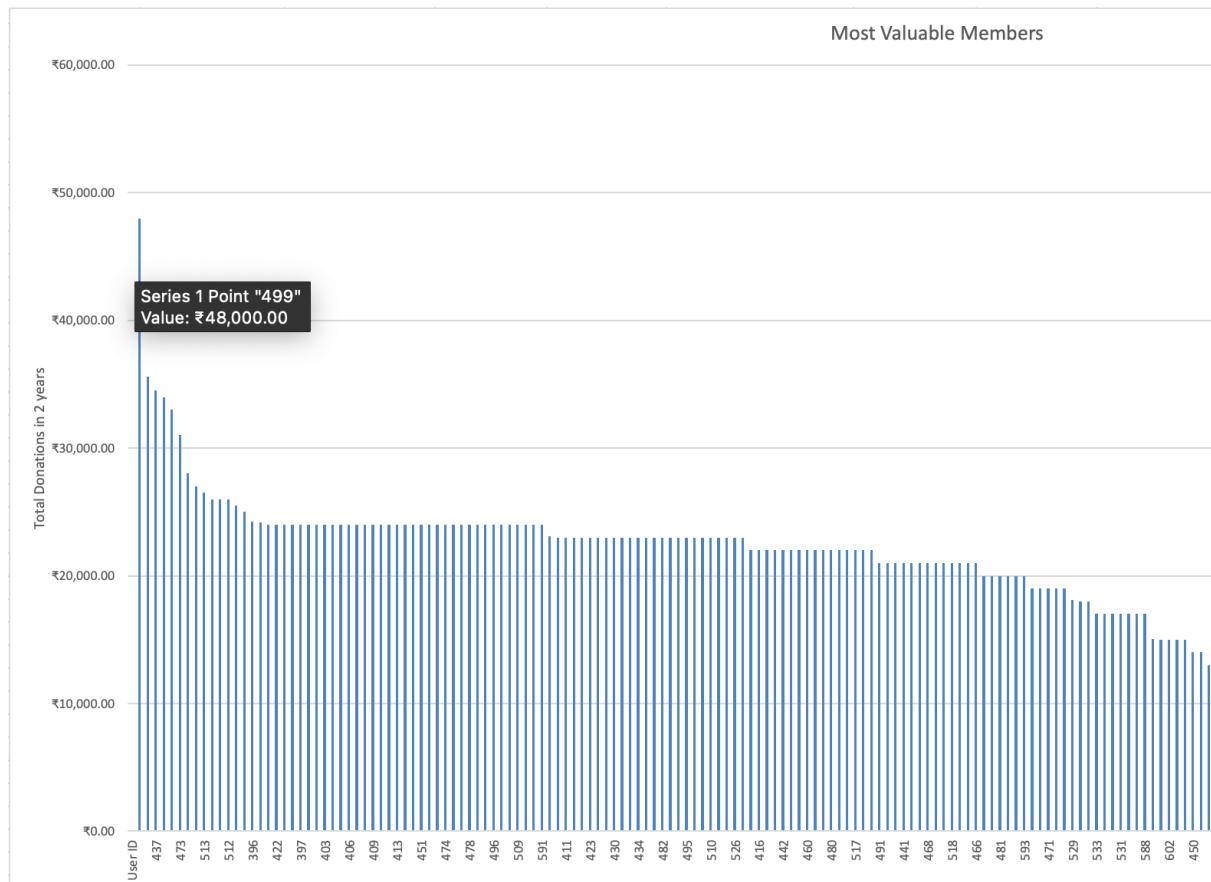
A Pareto analysis was conducted on the donation data to understand whether the 80/20 principle held for this specific case. Contrary to our expectations, the top 20% of donors did not contribute to 80% of the total donations, indicating a deviation from the typical Pareto

principle. This analysis suggests that the Trust relies on a broader base of donors, rather than a few high-value donors.



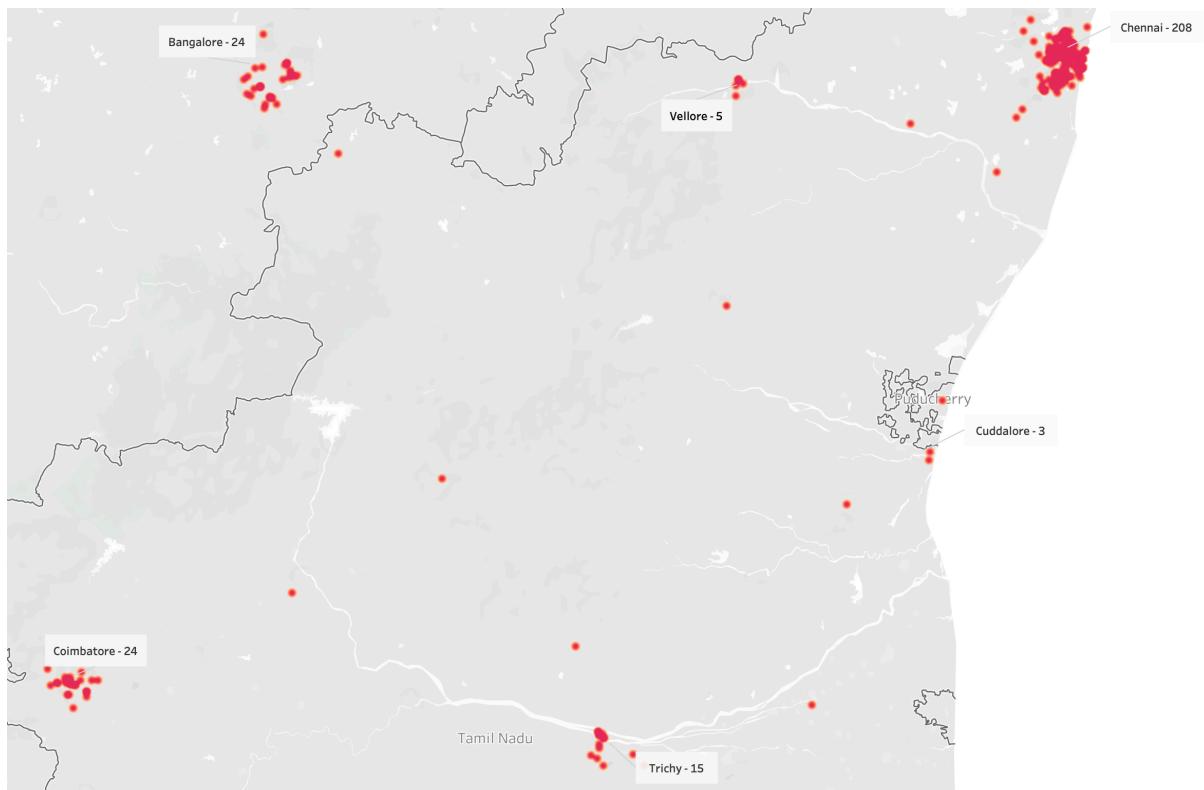
**Figure 2: Pareto Analysis and Member type distribution**

Next, a pie chart was constructed to visualize the distribution of member types within the Trust. This provided an understanding of the composition of the Trust's member base.



**Figure 3: Bar chart identifying the top donors**

Another bar chart was constructed to identify the members with the highest cumulative donations from 2021 to 2023. This helped in recognizing the most valuable members in terms of financial contributions to the Trust.



**Figure 4: Geospatial analysis identifying the member dense areas**

A geographic analysis of Trust members was conducted using Tableau to better understand demographic distribution and density. The analysis revealed a substantial concentration of members in South India, with Chennai alone accounting for 208 members, indicating the Trust's strong local presence and outreach.

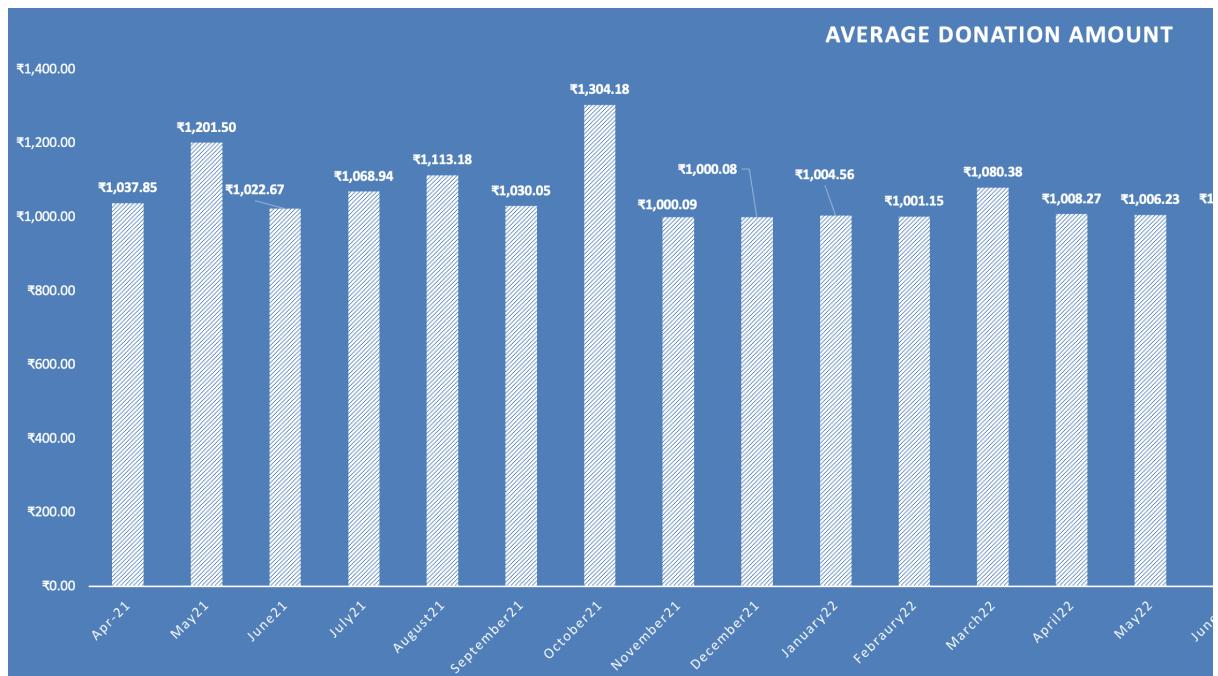
In contrast, the Trust's presence in North India was minimal, with only around ten members in total. This distribution could be attributed to the Trust's aid efforts primarily focusing on operations in and around Chennai.

Interestingly, the Trust also has an international footprint, with three members located in the USA. Despite being numerically small, this indicates an international interest in the Trust's activities. If the Trust has the ability to cultivate and manage these relationships, it could

potentially extend its international member base, thereby elevating its global profile and diversifying its support sources.

## Member Donation Analysis

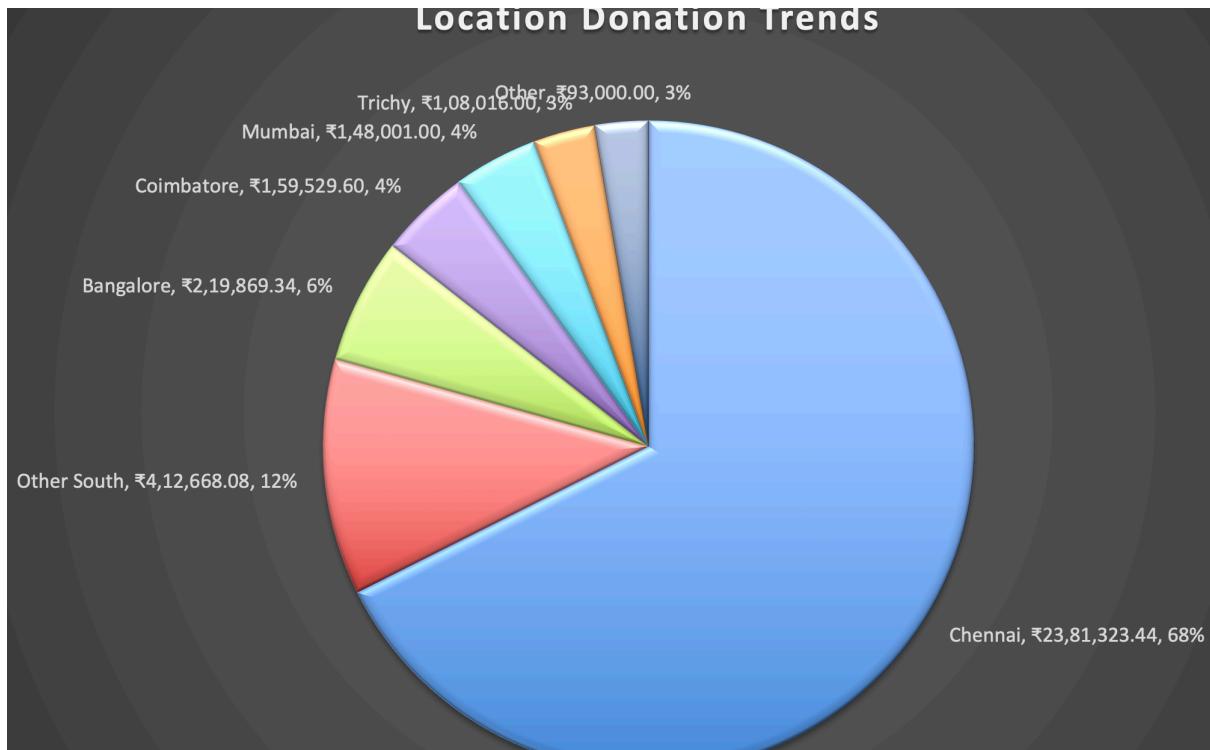
A bar chart was created to analyze the average monthly donation amount per member. Interestingly, this was found to be uniform at 1000 rupees per month, suggesting a standardized contribution culture within the Trust.



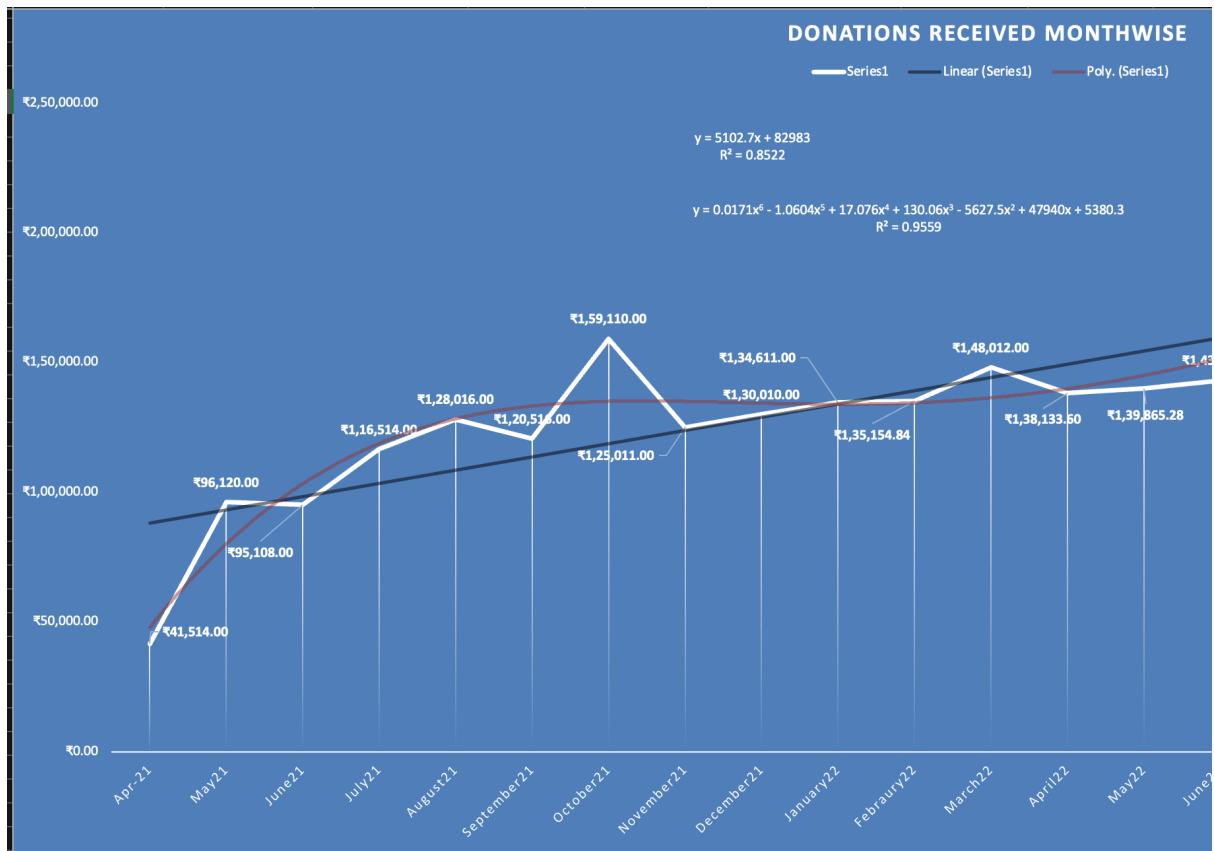
**Figure 5: Bar chart showcasing the average donation amount**

The pie chart illustrates the geographical breakdown of donation amounts, shedding light on the regions contributing the most to the trust. As anticipated, Chennai dominates the chart with an impressive 68% of total donations, contributing approximately ₹23,81,323.44. Bangalore and Coimbatore make significant contributions as well, with donation amounts totalling ₹2,19,869.34 and ₹1,59,529.60 respectively.

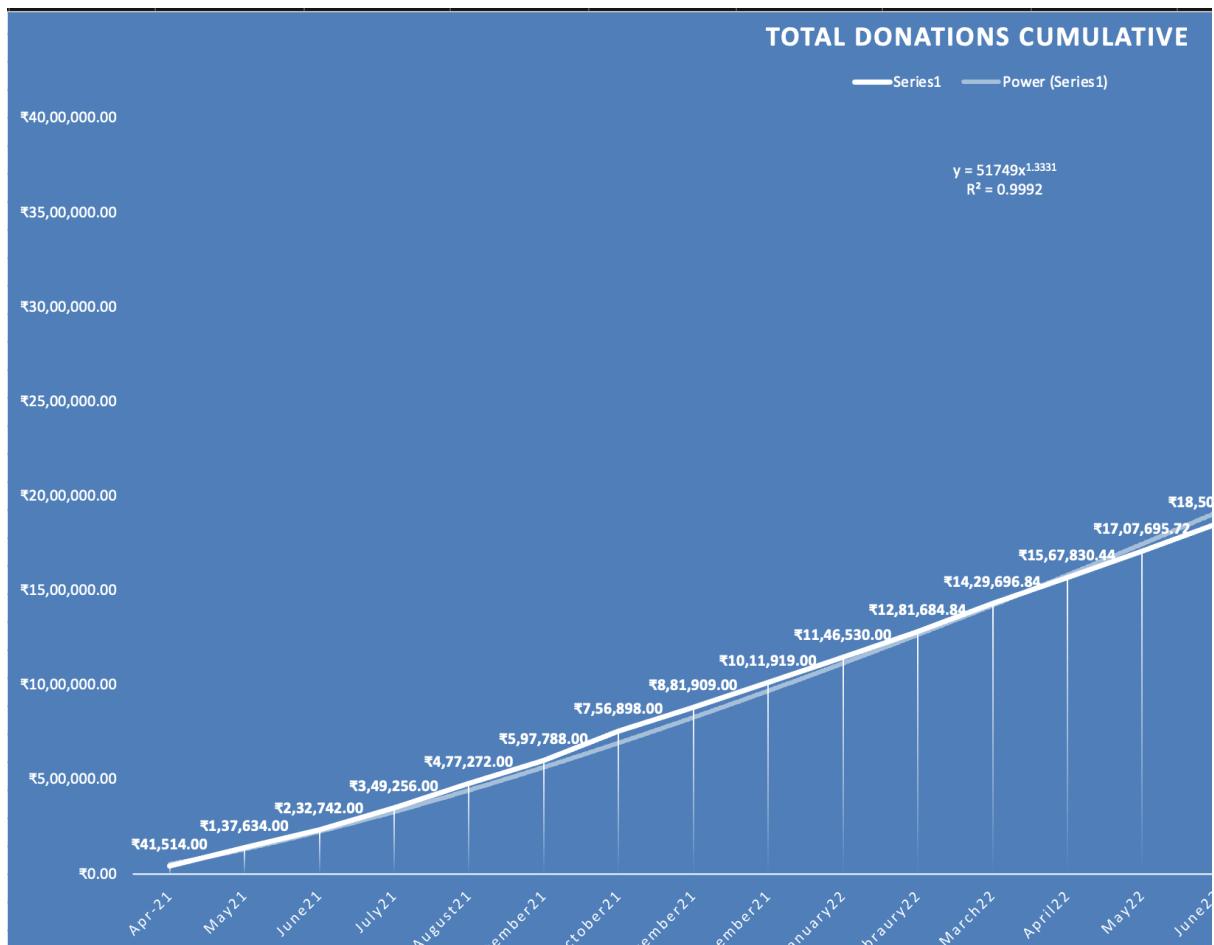
This analysis highlights the trust's substantial support base in Chennai and South India at large. Meanwhile, it also reveals a promising trend of donations coming from diverse locations, including those beyond the traditional southern strongholds.



**Figure 6: Pie chart showing the split in donations location wise**



**Figure 7: Month wise donations trend**

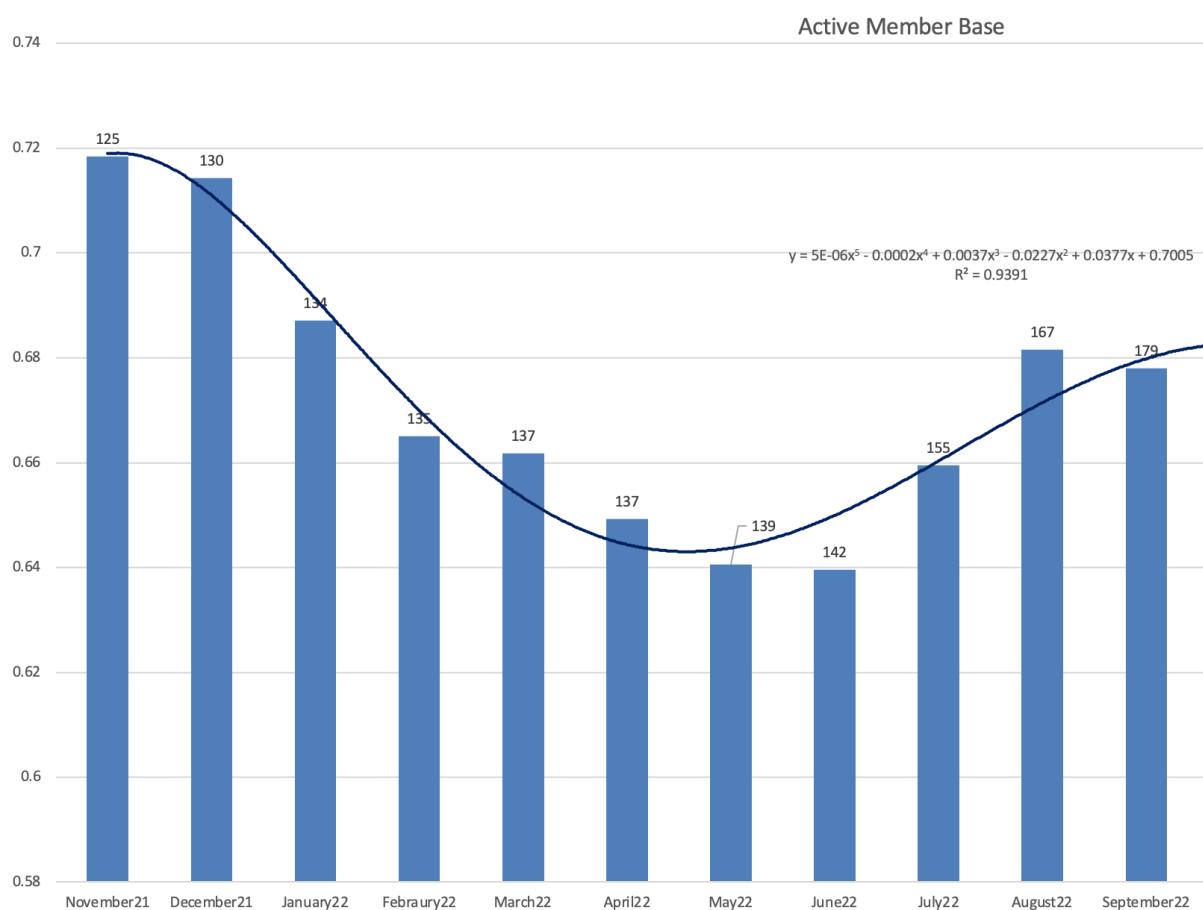


**Figure 8: Total donations accumulated**

Line charts were plotted to observe the patterns in monthly donations as well as the cumulative total donations. A 6th order polynomial regression equation was fitted to the month-wise donation data. Impressively, this model demonstrated a high degree of fit, with an R-squared value of 0.9559, suggesting that the model could explain approximately 95.59% of the variability in the donation data.

In the case of the total cumulative donations, a power function was employed to fit the data. Astonishingly, this model exhibited an even higher degree of fit, with an R-squared value of 0.9992. This implies that our model could explain about 99.92% of the variability in the cumulative donation data.

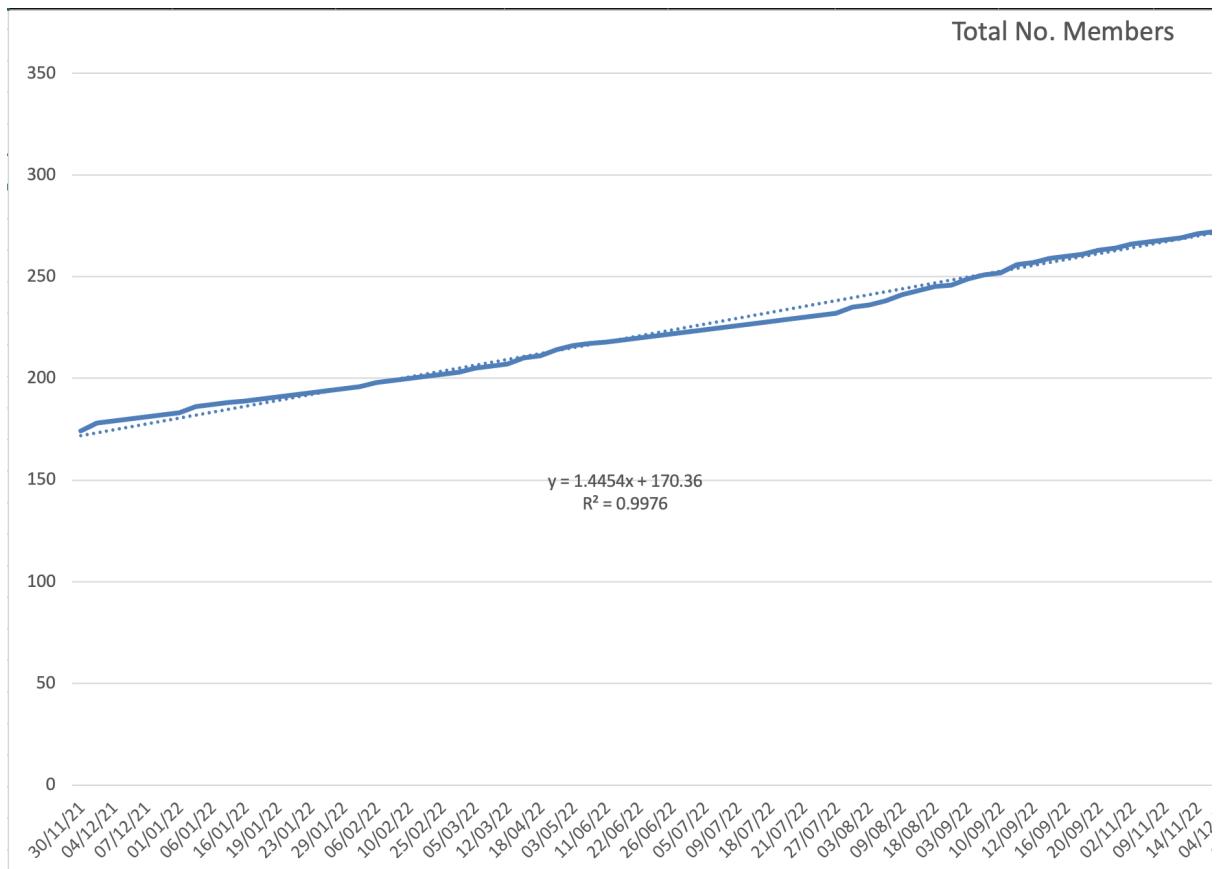
The substantial fits in these real-life data may be attributed to consistent donation patterns over time, which could be due to the sustained efforts of the Trust in maintaining regular communication with its donors and inspiring them to donate consistently.



**Figure 9: Trend showcasing the %members who have donated**

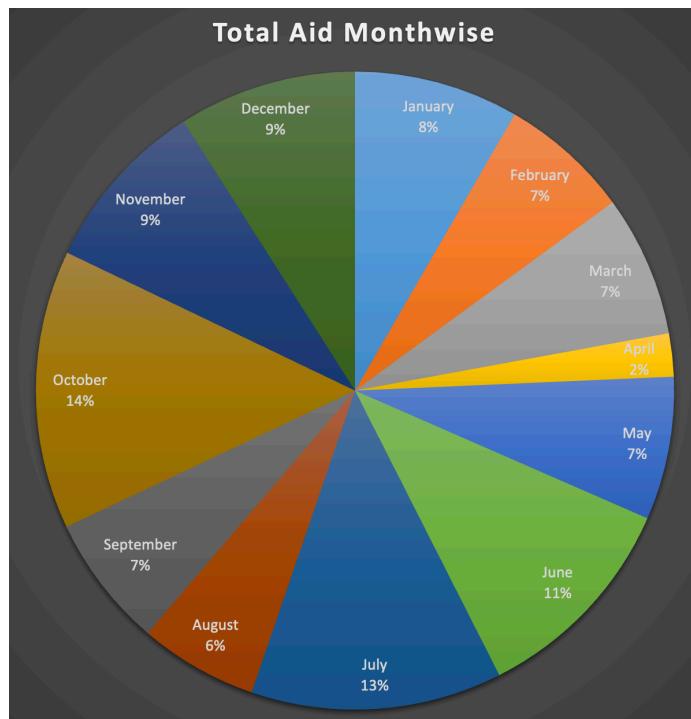
Further analysis was undertaken to understand the participation pattern within the Trust's member base. The first plot was a combination of a bar graph and a line chart. The line chart, fitted with a pentic polynomial regression, had an impressive R-squared value of 0.9391, signifying a high degree of fit. The analysis revealed a concerning trend - while the Trust's member base increased steadily over the years, the percentage of active members (those who donated at least once) was declining. Notably, the count of active members rose from 125 to 197 over two years, but this increase didn't keep pace with the growth of the overall member base, hence the dip in the active percentage.

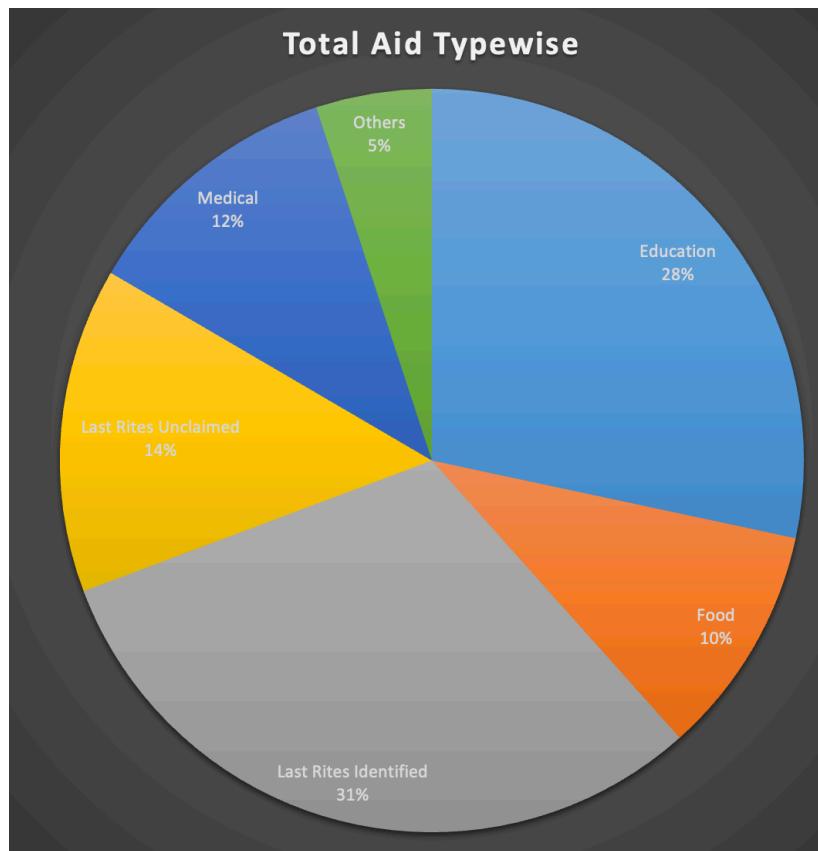
The second plot aimed at understanding the member base growth trend over time. A linear regression model was used for this purpose, and it provided an excellent fit with an R-squared value of 0.9976. This high R-squared value suggests that the Trust's member base has been growing at a fairly steady rate over time.



**Figure 10: Trend showcasing the member base expansion of the trust**

## Aid Analysis





**Figure 11: Distribution of Aid across Type and Month**

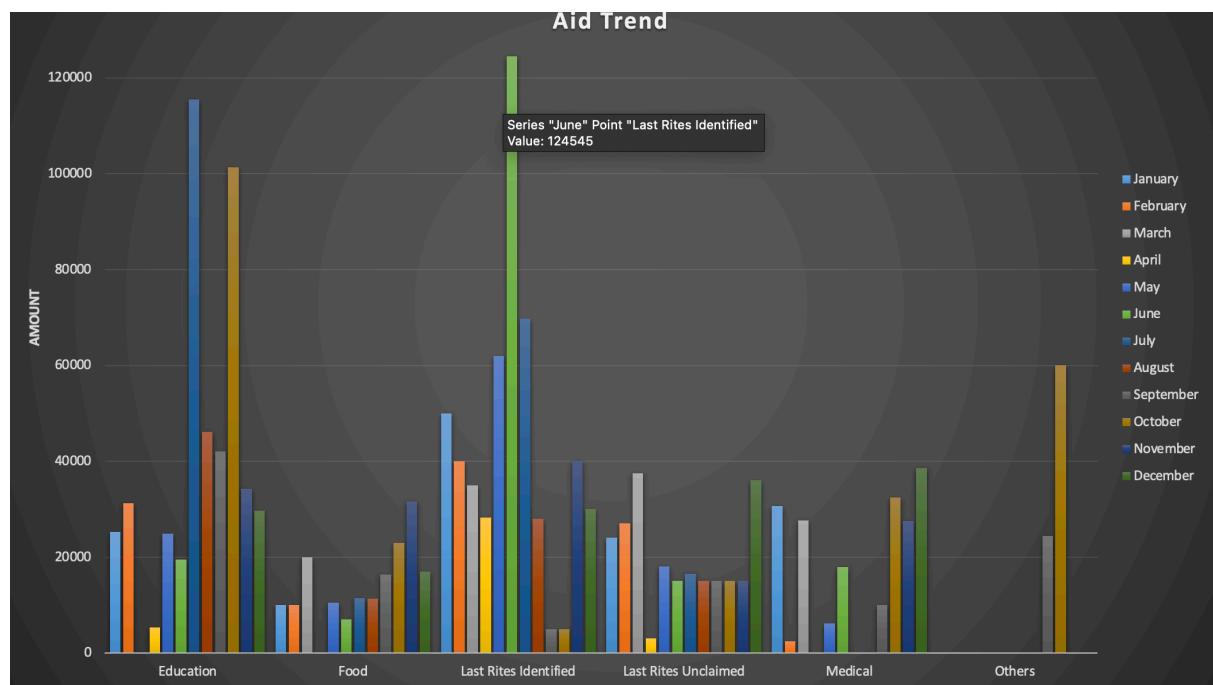
The distribution of aid was visualized through two pie charts. A consistent pattern was observed in the month wise distribution of aid, with each month receiving roughly 7-10% of the total annual aid. This consistency indicates a sustained level of activity by the Trust throughout the year without apparent periods of slack.

In terms of the type of aid, the analysis revealed that 45% of the total aid was allocated towards the Trust's primary objective. The remaining 55% was disbursed amongst several secondary objectives. A notable observation was that 28% of the aid was directed towards education, even though it is classified as a secondary objective of the Trust.

Upon examining the month wise aid amount trends depicted in a bar chart, certain anomalies were observed, particularly in the education and last rites aid categories spanning several months.

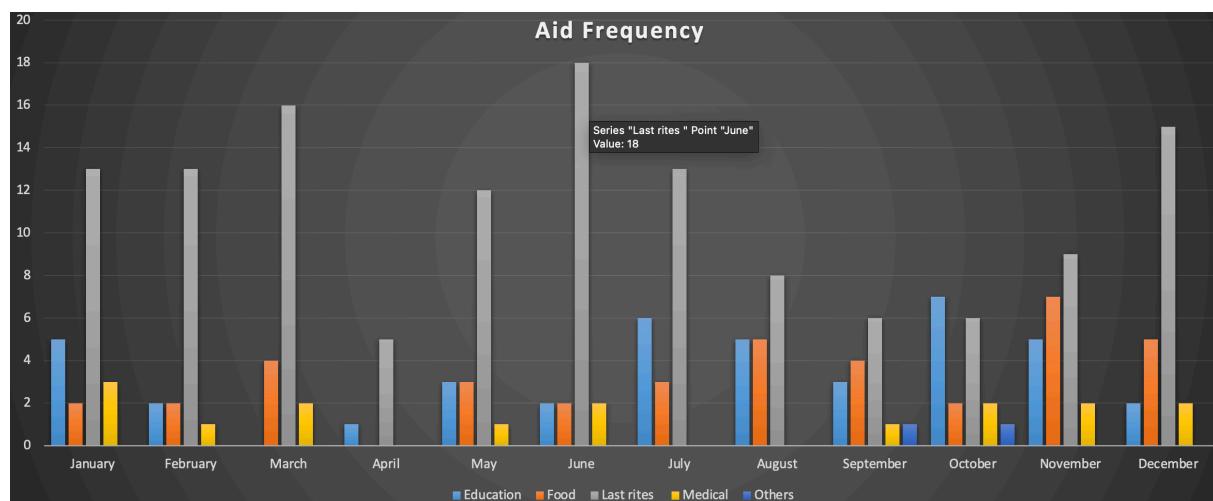
A spike in education aid during June-October 2021 was noted. This can be attributed to the fact that, due to the COVID-19 pandemic, school and college fees were paid in two

instalments during these months, which coincide with the beginning of a new academic year for both schools and colleges.



**Figure 12: Month wise Aid Amount Trend**

An unusual increase in the aid provided for last rites was observed during May-June-July 2021, which corresponds to the second wave of the COVID-19 pandemic. Credible sources report that the highest number of fatalities occurred in May, with a total of 120,529 deaths, followed by June and July, which reported 90,935 and 41,096 deaths respectively. This spike in deaths is likely the cause of the corresponding increase in last rites aid during this period.



**Figure 13: Month wise Aid Frequency Trend**

Analysis of the month wise aid frequency, as depicted by a bar chart, brought to light some noteworthy patterns. Consistent with the Trust's primary objective, the count of last rites aids distributed was high throughout the year, underlining the Trust's commitment to its core mission. The frequency of last rites aid particularly spiked during the months of May, June, and July, correlating with the second wave of the COVID-19 pandemic.

Interestingly, even though the share of last rites aid in monetary terms accounts for only 45% of the total, its frequency was the highest in all months. This can be explained by the fact that medical and education aids are generally larger in sum than last rites aids, a fact already established in the Descriptive Statistics section. Therefore, while last rites aid may not constitute the majority of aid in monetary terms, it plays a substantial role in the Trust's activities when considered in terms of frequency.

## **Balance Sheet Analysis**

The exploration of the balance sheet divulged numerous valuable insights pertaining to the functioning of this non-profit organization. A notable observation was the absence of liabilities, an unusual but positive trait in such financial statements. This indicates that the trust effectively uses its donations for its charitable activities, without resorting to loans or incurring debt.

The surplus of income, which includes both monthly and one-time donations less than ₹5,000, over the aid distributed, is systematically channelled into the capital fund. The capital fund, serving as a reserve for the short term goals of the trust amounted to ₹44,142 at the end of the fiscal year 2021-2022.

On the other hand, the organization has a unique practice of assigning any individual donation greater than ₹5,000 directly to the corpus fund. The corpus fund, typically meant to provide a secure base for a non-profit's operations, reached an impressive balance of ₹6,08,119 at the conclusion of the fiscal year 2021-2022. This is planned to be used for the trusts long term goals. These practices demonstrate the trust's commitment to financial sustainability and its efficient use of resources to drive its charitable endeavours.

Additional analysis of the income composition revealed that a significant proportion, 60% to be precise, is contributed by one-time donations. The remaining 40% is accounted for by recurring monthly donations. This highlights the substantial role of individual, non-recurring contributions in funding the trust's operations and, at the same time, underscores the importance of consistent monthly donors in providing a steady stream of income.

Moreover, the equity of the Trust stands at a solid ₹6,52,260.60, which indicates a financially healthy organization with a firm backing of its own funds. This strong equity position provides a robust base for the Trust to fund its activities and plans for expansion.

Importantly, the Trust has maintained an efficient Expense Ratio of 0.98. This implies that 98% of the total income is directly utilized for the Trust's core aid activities. In the context of a non-profit organization like this, a high Expense Ratio is generally a positive indicator. It demonstrates that the Trust is efficiently using its funds for the intended purpose, thus ensuring the maximum impact of its charitable work. This efficiency in resource use contributes significantly to the Trust's credibility and effectiveness as a non-profit entity.

## **Interpretation & Recommendations:**

Delving into the heart of the extensive analysis, a rich fabric of insights into the Trust's operations was unravelled. One intriguing finding lay in the discovery of a unique donation pattern, which diverged from the customary Pareto principle that commonly governs donor behaviour. Instead of a small subset of donors contributing the majority of funds (as dictated by the 80/20 rule), the Trust witnessed an unusually even distribution of donations, signifying a broad base of active contributors.

Moreover, consistency emerged as a key trait in the donations received by the Trust. The average monthly donation hovered around the mark of ₹1000 per member, forming a uniform pattern. This level of consistency in donations is generally an encouraging indicator of steady financial input.

From a geographical standpoint, the Trust demonstrated an impressive footprint, with a significant presence centred in Chennai, South India. It also managed to extend its reach

overseas to a certain extent, most notably to the USA, indicative of its international appeal and recognition.

An in-depth trend analysis on the monthly and cumulative donations data manifested a high degree of congruity, providing an optimistic forecast for the Trust's future growth. A power function proved to fit the cumulative donations data extremely well. Since power functions are strictly increasing, this suggests that the Trust can look forward to an unwavering trajectory of financial growth.

Nevertheless, amidst these positive insights, a potential area of concern was flagged. It was observed that despite the steady influx of new members into the Trust, active member participation showed signs of decline. This could signal a disengagement trend among newer members who might join, make a one-time donation, and then dwindle in activity.

Geographically, the Trust's preponderance in southern regions is a testament to its influence and acceptance in these areas. However, the potential for expanding into North India and international territories is promising and warrants exploration. Doing so could diversify the Trust's member base and potentially enhance its donation pool.

From a financial perspective, the Trust's balance sheet radiated a glow of stability and capability. Its commendable stance of carrying no liabilities, a robust equity value standing at ₹6,52,260.60, and a healthy expense ratio of 0.98 corroborates the Trust's firm financial footing. Moreover, the balanced composition of the Trust's income, split almost equally between one-time and monthly contributions, further attests to the sound financial status of the Trust.

However, a slightly disconcerting observation came to the fore upon realizing that despite the growing member base, the average donation amount remained static. This could indicate a varying degree of financial commitment across the member spectrum, with new members possibly not contributing as substantially as the existing ones. Alternatively, it may suggest a pattern of members joining, making a one-time donation, and then largely remaining inactive. This underlines the necessity for devising strategies aimed at bolstering member engagement and fostering a culture of consistent donations, particularly among new members.

When it comes to the Trust's aid distribution pattern, the analysis pointed out an area for potential realignment. Although the Trust's primary objective revolves around last rites aid, this category received only 45% of the total aid amount. Even though the frequency of last rites aid provided is the highest, there is scope to increase its monetary share to reflect the Trust's mission more strongly.

## **Conclusion :**

The Trust is performing admirably well in its operations, as reflected in the broad donor base, consistent donation patterns, and strong financial position. However, an emerging trend suggests that despite a steady increase in new members, overall member activity may be declining. Therefore, the primary objective moving forward should be to enhance member engagement. This could involve strategies to make new members feel more involved and initiatives that cultivate a sense of community among all members.

In conclusion, while the Trust has achieved significant milestones, addressing the identified area for improvement will ensure its continued success and impactful service.